UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/342,917	06/30/1999	HIROAKI SUGIURA	862.2900	7289

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EXAMINER
WANG, JIN CHENG

ART UNIT	PAPER NUMBER
2628	

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/342,917	SUGIURA, HIROAKI
	Examiner	Art Unit
	Jin-Cheng Wang	2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>02 February 2006</u>.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1,3-6,11 and 12</u> is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>1,3-6,11 and 12</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/2/2006 has been entered. Claims 1, 6, 11-12 have been amended. Claims 2-3, 7-10,and 13-23 have been canceled. Claims 1, 4-6, and 11-12 are pending in the present application.

Response to Arguments

Applicant's arguments filed February 2, 2006 have been fully considered, but are moot in view of the new ground(s) of rejection. As addressed below, Komaki, Schwartz and teach the claim limitations.

For example, the base claim 1 recites the two "wherein each of the weight values is calculated by an integer computation using **distance between positions of input data and grids adjacent to the input data**." From applicant's specification, distance between position of input data and grid points adjacent to the input point has never been used. Instead, the different between the X coordinate of the input point and the X coordinate of a grid is used, e.g., X-X0 (See page 11 of applicant's specification). **It is noted that in Page 11, applicant stated that (X1-X0), (X1-X) and (X-X0) have no bearing as weights**, but ratios of two values have bearing as weights.

Moreover, according to applicant's specification, for example, equations 6-10 of applicant's specification, to which applicant's claim 1 is most relevant, the weight value is calculated using the ratios of two value, e.g., X-X0 and X1-X0, and is multiplied by a constant which is a power of 2. It cannot be said that the weight value is exactly calculated by an integer computation using distance between positions of input data and a grid adjacent to the input data.

The base claim 1 also recites the claim limitation of "determining a relationship of greater or smaller among the weight values". However, this claim limitation is not described in the specification. For example, in Page 16 of applicant's specification, the relationship of the greater or smaller values between u', v' and w' are determined. However, u', v' and w' are not weight values (See also Page 14 of applicant's specification). The output P is calculated based on the relationship between u' and v'. There is never a comparison between the weight values. **It should be noted that in Page 11, applicant stated that (X1-X0), (X1-X) and (X-X0) have no bearing as weights**, but ratios of two values have bearing as weights.

Komaki discloses the weight values are calculated differently for the output point based on the determination of the relative positions of the input point to the grids; see Figs. 20-37 of Komaki wherein the relative position of the input point to the grids changes for each of the Figs. 20-37 and therefore the weights are differently assigned for calculating the output point.

Although Komaki does not exactly disclose "each of the weight values is calculated by an integer computation using distance between positions of input data and grids adjacent to the input data, and is multiplied by a constant which is a power of 2 greater than the intervals of the

grids" in view of the some values disclosed in applicant's specification in various forms,

however, Komaki discloses the weight value is calculated using distance between the positions

of input data and grids adjacent to the input data (see, Figs. 6-37). The weight value $2^{\{n\}} - dy -$

dz is calculated using $1 - (dy+dz)/2^n$ by an addition between integers $0 < dy, dz < 2^n$ and

division by the integer 2^n and is multiplied by a power of 2 greater than the intervals of the

grids; see col. 9-11 and 13; Figs. 4-37. Moreover specifically, applicant's weight value in the

specification may be different in various different embodiments which may further be a variation

of Komaki's weight values. It would have been obvious to one of the ordinary skill in the art at

the time of the invention was made to have modified Komaki's weight values because Komaki

teaches a variety of different weight values in the computation (See Figs. 6-37). Modifying the

weight values of Komaki would enable different computation schemes to be realized for

different input points (See Komaki Figs. 6-37).

Komaki does not specifically teach the claim limitation of "the interpolation is executed

by an integer computation and uses the constant as a divisor".

However, Komaki suggests the claim limitation of "the interpolation is executed by an

integer computation and uses the constant as a divisor" in col. 2, lines 10-30 and col. 9-11 and 13

wherein a constant of power of 2 such as 2^n has been used as a divisor in the interpolation

formula and the interpolation has employed subtraction, addition and division among some

integers (*see also* col. 9-11 and 13).

Therefore, according to the teaching of Komaki, it would have been obvious to

incorporate a divisor and integer computation in the interpolation. Doing so would enable

accuracy and efficiency without sacrificing speed or error performance.

Komaki does not specifically teach the claim limitation of "grids arranged at non-uniform intervals".

However, Schwartz teaches the claim limitation of "grids arranged at non-uniform intervals" used to create the look-up table for the non-uniform output grid to produce the non-uniformity and create a spacing that increases as the distance from the point of interest increases and thereby the accuracy is three times greater in the region of interest for a non-uniform grid than a uniform grid in a three-dimensional color space (see Schwartz Figs. 6, 9-10 and column 3-5).

According to the combined teaching of Komaki and Schwartz, it would have been obvious to incorporate a non-uniform grid in a color look-up table. Doing so would enable the accuracy three times greater in the region of interest for a non-uniform grid than a uniform grid in a three-dimensional color space (see Schwartz Figs. 6, 9-10 and column 3-5).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4-6, and 11-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the

relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

For example, the base claim 1 recites the two "wherein each of the weight values is calculated by an integer computation using **distance between positions of input data and grids adjacent to the input data**." From applicant's specification, distance between position of input data and grid points adjacent to the input point has never been used. Instead, the different between the X coordinate of the input point and the X coordinate of a grid is used, e.g., X-X0 (See page 11 of applicant's specification). **It is noted that in Page 11, applicant stated that (X1-X0), (X1-X) and (X-X0) have no bearing as weights**, but ratios of two values have bearing as weights.

Moreover, according to applicant's specification, for example, equations 6-10 of applicant's specification, to which applicant's claim 1 is most relevant, the weight value is calculated using the ratios of two value, e.g., X-X0 and X1-X0, and is multiplied by a constant which is a power of 2. It cannot be said that the weight value is exactly calculated by an integer computation using distance between positions of input data and a grid adjacent to the input data.

The base claim 1 also recites the claim limitation of "determining a relationship of greater or smaller among the weight values". However, this claim limitation is not described in the specification. For example, in Page 16 of applicant's specification, the relationship of the greater or smaller values between u', v' and w' are determined. However, u', v' and w' are not weight values (See also Page 14 of applicant's specification). The output P is calculated based on the relationship between u' and v'. There is never a comparison between the weight values. **It**

should be noted that in Page 11, applicant stated that (X1-X0), (X1-X) and (X-X0) have no bearing as weights, but ratios of two values have bearing as weights.

To comply with the "written description" requirement of 35 U.S.C. 112, first paragraph, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filling date sought, he or she was in possession of the invention. The invention is, for purposes of the "written description" inquiry, whatever is now claimed. Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). For purposes of written description, one shows "possession" by descriptive means such as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). Such descriptive means cannot be found in the disclosure for the inventions of the base claim 31, 32 and 36.

Claims 4-5 depend upon the claim 1 and are rejected due to their dependency on the claim 1.

The base claims 6, 11 and 12 are subject to the same rationale of rejection set forth in the claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-6 and 11-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For example, the base claim 1 recites the "weight values". However, the claim 1 does not

particularly points out what constitute the weights and therefore rendering the claim 1 indefinite.

Thus, applicant failed to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

Claims 4-5 depend upon the claim 1 and are rejected due to their dependency on the

claim 1.

The base claims 6, 11 and 12 are subject to the same rationale of rejection set forth in the

claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

Claims 1, 3-6 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Komaki U.S. Patent No. 5,883,821 (hereinafter Komaki) in view of Schwartz U.S. Patent No.

5,644,509 (hereinafter Schwartz).

Re claim 1, Komaki teaches a data conversion method of performing image processing

on image data expressed in plural components by using a multi-dimensional look-up table (LUT)

and outputting processed image data comprising the steps of setting grid positions (*selecting the*

grid positions) of the multi-dimensional look-up table, obtaining output data of grids of the

multi-dimensional look-up table which corresponds to the input image data (*col. 1, lines 61-67*),

generating a weight table to store weight values based on the set grid positions wherein each of

the weight values is calculated by an integer computation using distance between positions of

input data and grids adjacent to the input data, and is multiplied by a constant which is a power

of 2 greater than the intervals of the grids (*e.g., $2^{n} - dy - dz$ is calculated using $1 -$*

$(dy+dz)/2^{n}$ by an addition between integers $0 < dy$, $dz < 2^{n}$ and division by the integer 2^{n}

and is multiplied by a power of 2 greater than the intervals of the grids; see col. 9-11 and 13;

Figs. 4-37), obtaining the weight values corresponding to the plural components of input image

data by referring to the weight table (*col. 9-11 and 13*), determining a relationship of greater or

smaller among the weight values (*e.g., the cited reference discloses the weight values are*

calculated differently for the output point based on <u>the determination</u> of the relative positions of

the input point to the grids; see Figs. 20-37 of Komaki); calculating the processed image data

which corresponds to the input image data by interpolation using the obtained output data, the

obtained weight values and the constant (*col. 2, lines 10-30; col. 9-11 and 13*) and an expression

corresponding to the determined result of the determining step (<u>***e.g., the cited reference discloses***</u>

<u>***the weight values are calculated differently for the output point based on the determination of***</u>

<u>***the relative positions of the input point to the grids; see Figs. 20-37 of Komaki wherein the***</u>

<u>***relative position of the input point to the grids changes for each of the Figs. 20-37 and***</u>

<u>***therefore the weights are differently assigned for calculating the output point***</u>).

    In other words, Komaki teaches data transformation corresponds to data conversion as

claimed. Data conversion is converting one data into another and data transformation is

converting data too. Furthermore, Komaki transforms output data for a point from a sample

point such as a grid point in a three dimensional look-up table (LUT). He teaches the input

signals R, G, B is interpolated and the values are stored in the look-up table (LUT). In addition,

Komaki transform output data for a point from a sample point such as a grid point in a three

dimensional look-up table (LUT). Also, a function must be determined for the purpose of

converting pixel color representations into known quantities of colored printer inks, typically

with the amount expressed as an integer in the range of 0 to 255 for each of cyan, magenta,

yellow, and black. The function accepts input values for the variables red, green, and blue, and

produces output values which represent quantities of cyan, magenta, yellow, and black. Other

color spaces in use as either input or output spaces include the colorimetric spaces which

represent color based on the tristimulus values that represent a standard observer as defined by

the Commission Internationale de l'Eclairage. CIE L*a*b* CIE L*u*v* and CIE XYZ are three

spaces. In addition, Komaki discloses grids arranged at non-uniform intervals and a constant

such as 2^n which is a large value greater than a value corresponding to a maximum interval (n)

of the grids (col. 9. line 61 to col. 11, line 14). The interpolation to be performed becomes an

eight point interpolation using eight grid point data when k is eight and the interpolation space

becomes cubic. The interpolation to be performed becomes a five point interpolation using five

grid point data when k is five. The shape of the solid body to express the interpolation space is

then variable depending upon selection of the five grid points.

Although Komaki does not exactly disclose "each of the weight values is calculated by an

integer computation using distance between positions of input data and grids adjacent to the

input data, and is multiplied by a constant which is a power of 2 greater than the intervals of the

grids" in view of the some values disclosed in applicant's specification in various forms,

however, Komaki discloses the weight value is calculated using distance between the positions

of input data and grids adjacent to the input data (see, Figs. 6-37). The weight value $2^{n} - dy -$

dz is calculated using $1 - (dy+dz)/2^n$ by an addition between integers $0 < dy$, $dz < 2^n$ and

division by the integer 2^n and is multiplied by a power of 2 greater than the intervals of the

grids; see col. 9-11 and 13; Figs. 4-37. Moreover specifically, applicant's weight value in the

specification may be different in various different embodiments which may further be a variation

of Komaki's weight values. It would have been obvious to one of the ordinary skill in the art at

the time of the invention was made to have modified Komaki's weight values because Komaki

teaches a variety of different weight values in the computation (See Figs. 6-37). Modifying the

weight values of Komaki would enable different computation schemes to be realized for

different input points (See Komaki Figs. 6-37).

Komaki does not specifically teach the claim limitation of "the interpolation is executed

by an integer computation and uses the constant as a divisor".

However, Komaki suggests the claim limitation of "the interpolation is executed by an

integer computation and uses the constant as a divisor" in col. 2, lines 10-30 and col. 9-11 and 13

wherein a constant of power of 2 such as 2^n has been used as a divisor in the interpolation

formula and the interpolation has employed subtraction, addition and division among some

integers (*see also* col. 9-11 and 13).

Therefore, according to the teaching of Komaki, it would have been obvious to

incorporate a divisor and integer computation in the interpolation. Doing so would enable

accuracy and efficiency without sacrificing speed or error performance.

Komaki does not specifically teach the claim limitation of "grids arranged at non-uniform intervals".

However, Schwartz teaches the claim limitation of "grids arranged at non-uniform intervals" used to create the look-up table for the non-uniform output grid to produce the non-uniformity and create a spacing that increases as the distance from the point of interest increases and thereby the accuracy is three times greater in the region of interest for a non-uniform grid than a uniform grid in a three-dimensional color space (see Schwartz Figs. 6, 9-10 and column 3-5).

According to the combined teaching of Komaki and Schwartz, it would have been obvious to incorporate a non-uniform grid in a color look-up table. Doing so would enable the accuracy three times greater in the region of interest for a non-uniform grid than a uniform grid in a three-dimensional color space (see Schwartz Figs. 6, 9-10 and column 3-5).

Re claim 4, Komaki discloses grid positions corresponding to each of the components are set the same (Fig. 2-3). In figure 2 and 3, Komaki discloses the grid points are equal to each other and he performs interpolation by dividing interpolation grid into equal size thus each position are the same.

Re claim 5, Komaki discloses input value is image data in one of RGB, CMY, and XYZ color spaces (col. 1. lines 17-36 and 51-67; col. 9, lines 1-34). In other words, Komaki teaches input luminance signals RGB.

Re claim 6, the limitation of claim 6 is identical to claim 1 above. Therefore, claim 6 is treated with respect to grounds as set forth for claim 1 above.

Re claim 11, the limitation of claim 11 is identical to claim 1 above except for a computer program product comprising a computer readable medium having a computer program code. Therefore, claim 11 is treated with respect to grounds as set forth for claim 1 above except for a computer program product comprising a computer readable medium having a computer program code.

As for a computer program product comprising a computer readable medium having a computer program code, Komaki teaches a program readable by a computer (col. 4, lines 57-59). When a computer has program then executes to allow the coding to program the system.

Re claim 12, the limitation of claim 12 is identical to claim 1 above except for a computer readable medium recorded data. Therefore, claim 12 is treated with respect to grounds as set forth for claim 1 above except for a computer readable medium recorded data. As for a computer readable medium recorded data, Komaki teaches a storage medium storing a program readable by a computer (col. 4. lines 57-59). A program readable by a computer corresponds to a computer readable medium recorded data. A recorded data is a stored data.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jcw